

# Hungry Horse Dam Operations

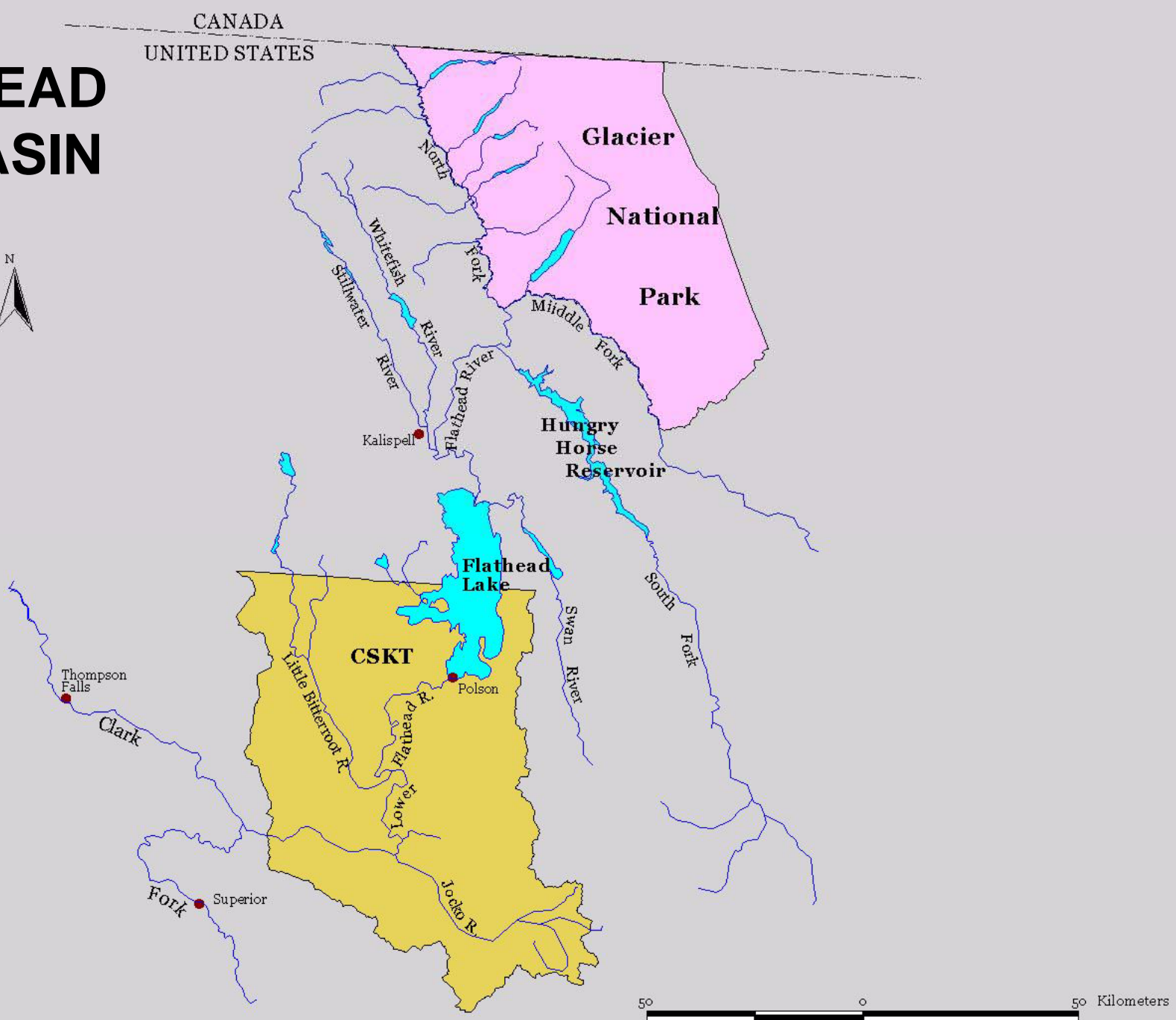
## Montana Fish, Wildlife & Parks

*research funded by*  
**Bonneville Power Administration**

**Brian Marotz - Hydropower Mitigation Coordinator**



# FLATHEAD SUBBASIN





# Fisheries Losses Attributed to the Construction and Operation of Hungry Horse Dam

## Annual Fisheries Losses

- 65,000 westslope cutthroat trout
- 250,000 juvenile bull trout
- 100,000 adult kokanee



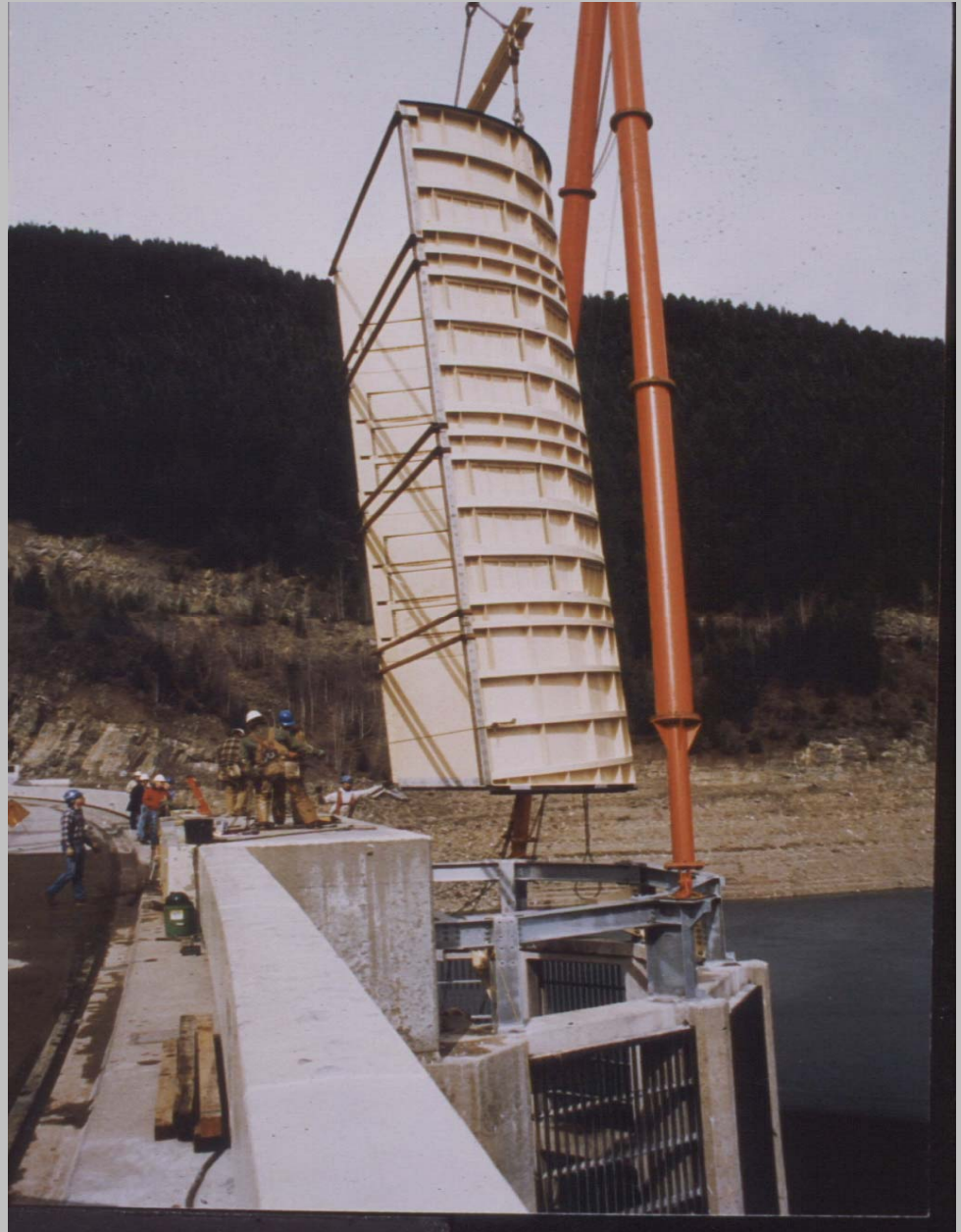
## Stream Habitat Losses

- 35 miles of South Fork
- 43 miles of tributaries



# INSTALLATION OF SELECTIVE WITHDRAWAL - 1995

## *HUNGRY HORSE DAM, MONTANA*



# Bull Trout



# Westslope Cutthroat Trout

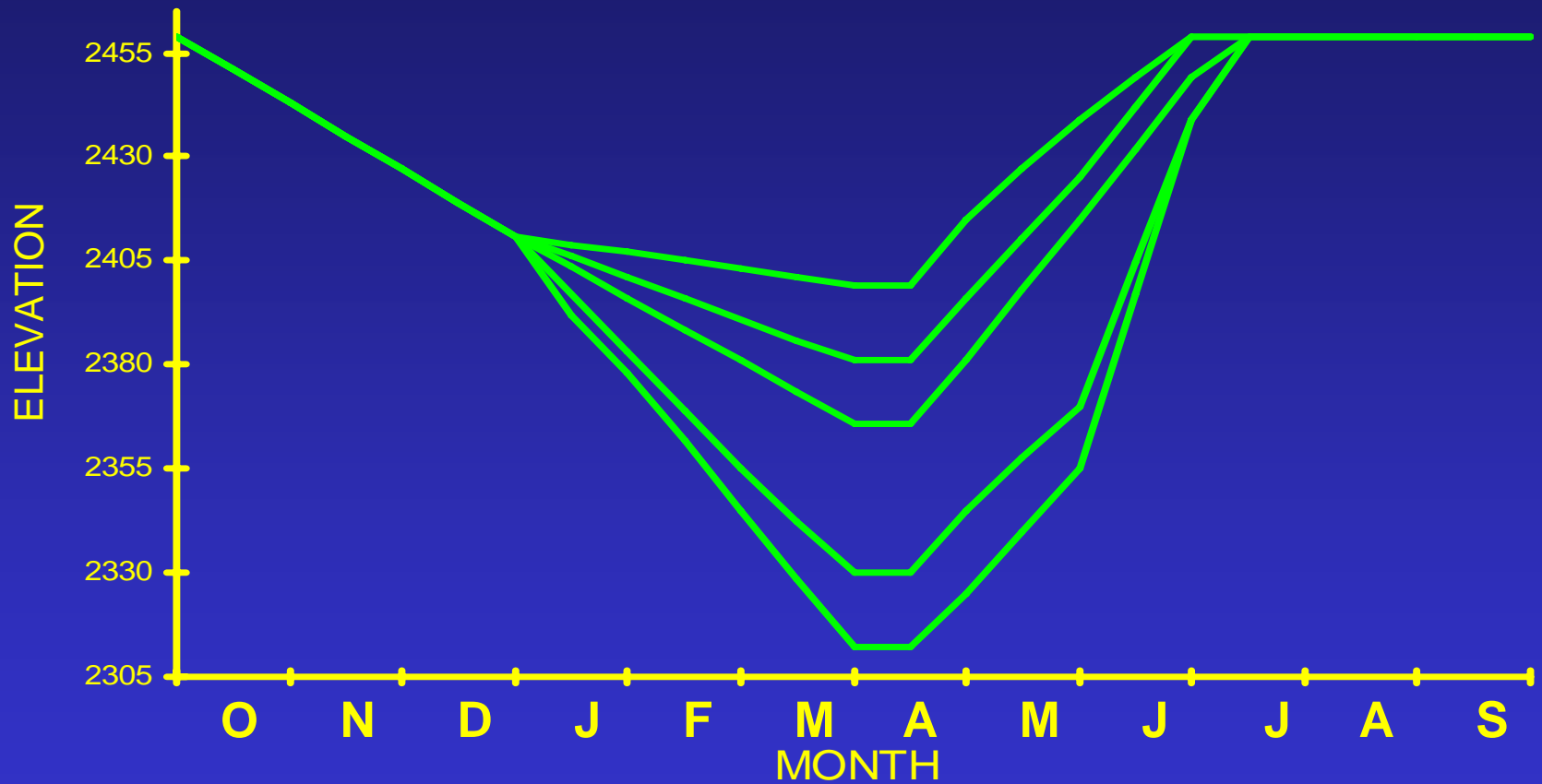






# Integrated Rule Curves

## VARQ flood control

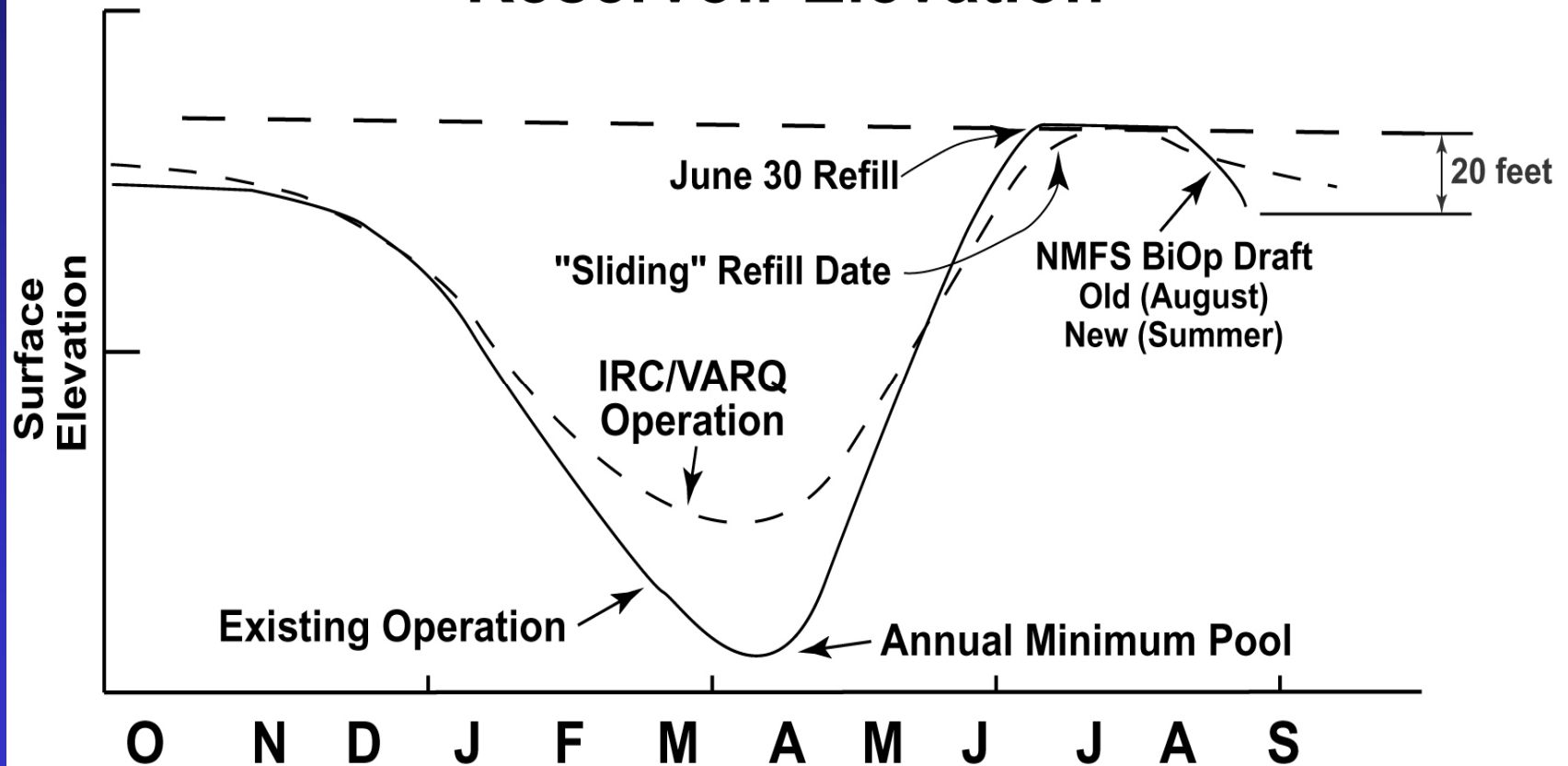


**VARQ flood control reduced drawdown and improved reservoir refill**

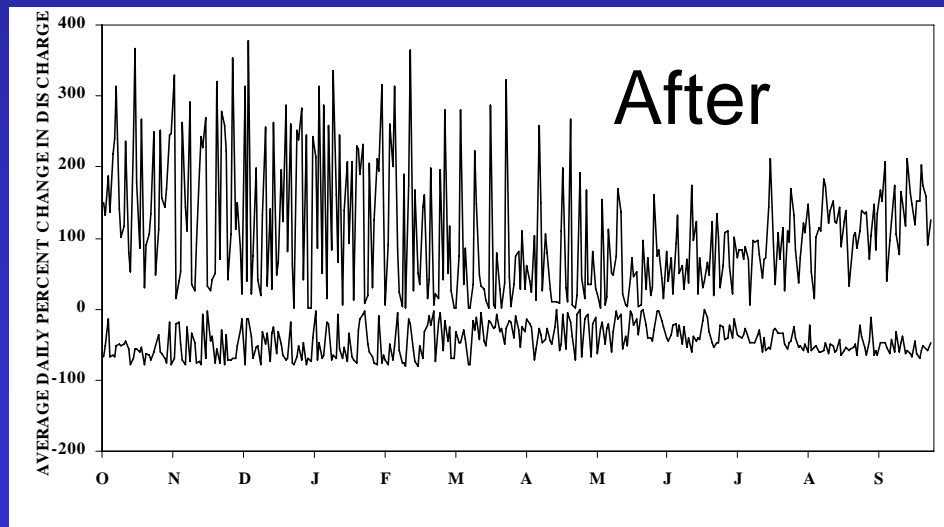
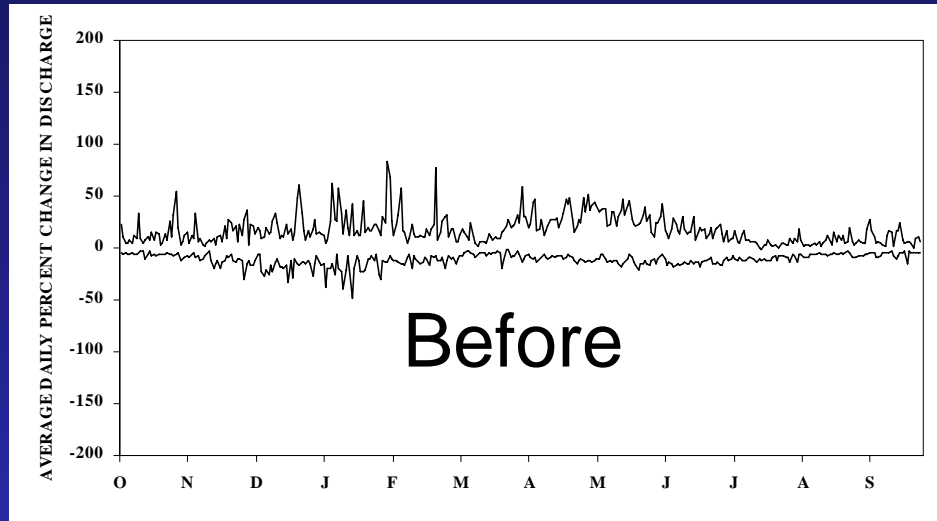
**Sliding refill date reduces potential for fill and spill**

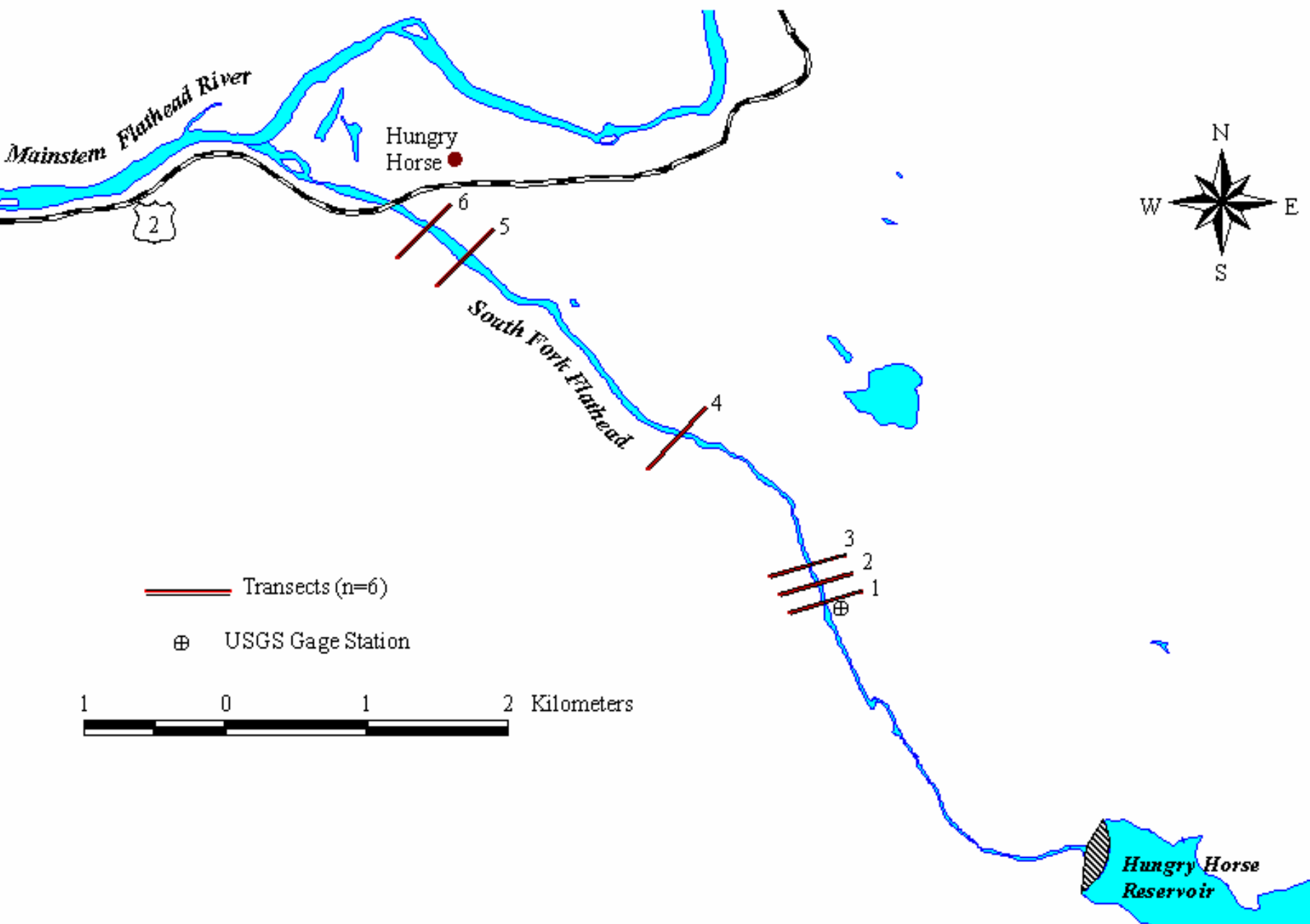
**Summer releases for salmon flows to be extended through September**

## Reservoir Elevation



# River flow fluctuations increased by Dam Operations





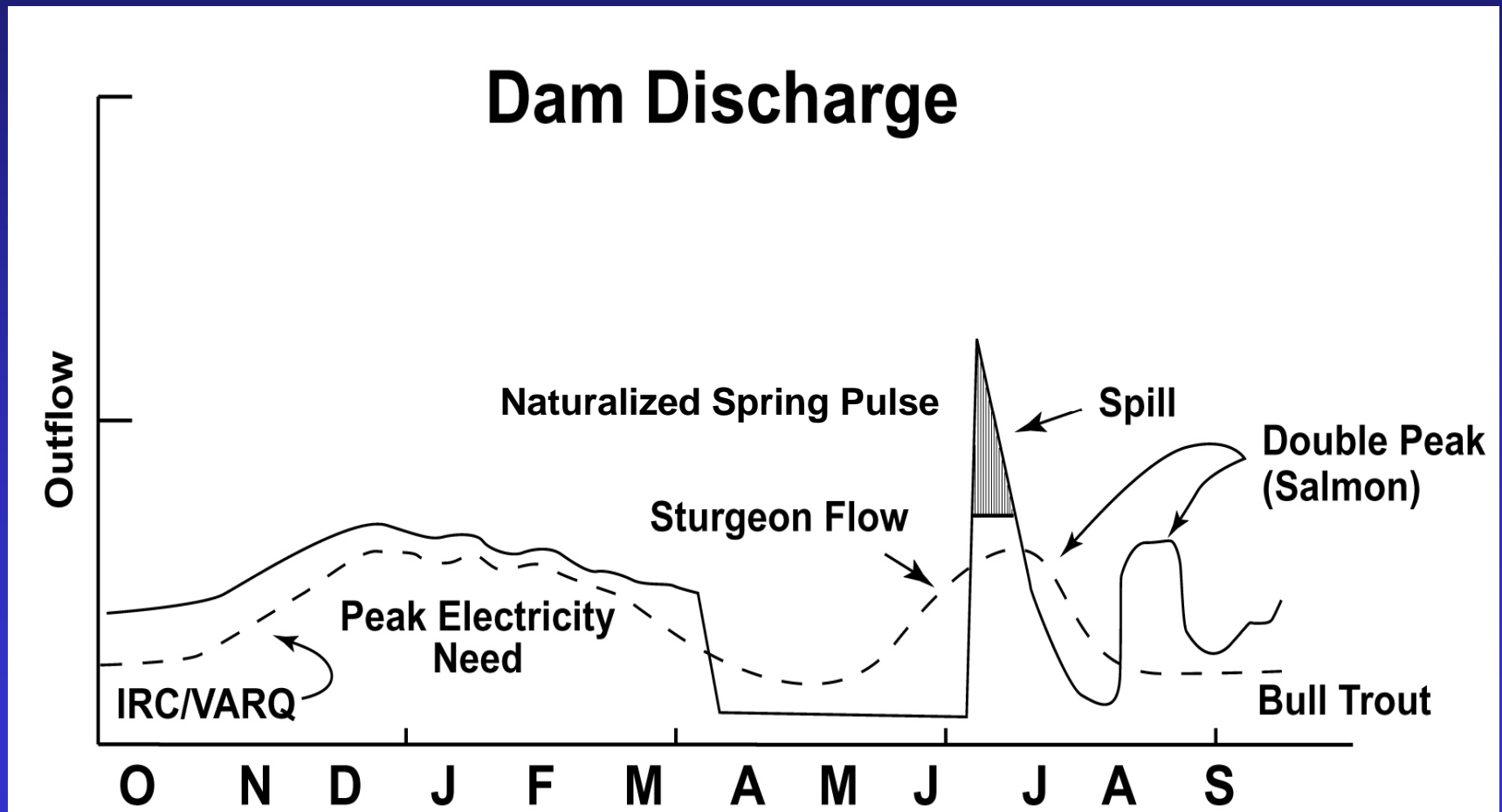
- Minimum Flow in the South Fork River downstream of Hungry Horse Dam increased from 145 cfs to 900 cfs during average and higher wateryears
- During dry years, the minimum flow requirement reduces toward 400 cfs during drought
- The Minimum Flow in the Flathead River at Columbia Falls is 3,500 cfs and higher flows for salmon flow augmentation have been stabilized

# Aquatic and Terrestrial Insects



Naturalized spring pulse within flood constraints

Double peak replaced by gradual decline after spring peak



# Improvements to Date

- Integrated Rule Curves reduced reservoir drawdown and improved reservoir refill
- Sliding Refill Date reduces potential for fill and spill, which causes gas supersaturation that harms fish and insects
- When fully implemented, the Montana Reservoir Operation Plan will reduce summer reservoir drawdown to 10 feet in all years except the driest 20 percentile drought years
- Dam discharge now protects minimum flows in the South Fork River to 900 cfs in average or higher wateryears and reduces to 400 cfs during drought
- Minimum Flows in the mainstem Flathead River are 3,500 cfs and higher salmon flows remain stable or gradually declining through September

Bull Trout

